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THE PLANT DISEASE REPORTER

Issued By

THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
AGRICULTURAL RESEARCH ADMINISTRATION
UNITED STATES DEPARTMENT OF AGRICULTURE

Volume 30 Number 8

August 15, 1946

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station Beltsville, Maryland

Volume 30 August 15, 1946 Number 8

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ADDITIONAL REPORTS OF LATE BLIGHT ON POTATO AND TOMATO

Reports of unusually general and severe incidence of late blight, especially on tomato, prompted the Survey to ask collaborators for rather complete information on occurrence of the disease this year, on both potato and tomato, with special reference to severity, control measures applied, time of appearance, and probable source of infection. Supplement 164 contains the answers to this request.

A few reports received too late to be included or reporting additional developments since Supplement 164 was compiled, follow.

TOMATO LATE BLIGHT IN MISSISSIPPI

By John T. Presley

Since my earlier report [P.D.R. Suppl. 164], we had a short but severe outbreak of late blight which practically defoliated all of the early planted tomatoes. Mr. Bowers here at State College has some later plantings that show very little, if any, late blight injury, but there is considerable early blight showing up.

Effect of stage of maturity on progress of late blight in Mississippi is certainly suggested in Mr. Bowers' plantings, where his early planted material has lost all the leaves but the later planted, immediately adjacent, is still pretty well covered with leaves. -- Mississippi State College. July 18.

PROGRESS OF LATE BLIGHT ON POTATO AND TOMATO IN EASTERN VIRGINIA

By Harold T. Cook

Late blight has continued to spread and is estimated to have reduced the total yield of potatoes in Eastern Virginia about 10 percent. Reduction was much greater in individual fields in which the blight developed early. Greater losses were caused by the production of a larger proportion of number two's and by late blight rot enroute to market.

The tomato crop in Eastern Virginia has been seriously damaged by late blight. A third of the foliage of the plants in many fields has been destroyed and approximately 90 percent of the fruit approaching maturity is affected.

The disease was most severe at first on tomatoes adjacent to badly blighted potato fields, but in recent weeks it has become widely distributed in other fields and in sections where few potatoes are grown.

The spread and development of late blight has been favored by abnormally low temperature and frequent rain. -- Virginia Truck Experiment Station, Norfolk. July 15.

LATE BLIGHT ON POTATOES AND TOMATOES IN WESTERN VIRGINIA

By S. B. Fenne

Since my earlier report [PDR Suppl. 164], I find that late blight has appeared on tomatoes quite generally throughout this area. Potatoes are going down fast. The tomato infection apparently is originating from affected potatoes. -- Virginia Polytechnic Institute. June 21.

VIRGINIA MAY LOSE LARGE TOMATO CROP

From Press Release

Plant specialists of the Virginia Agricultural Extension Service, watching the weather vane provided by eastern shore and northern neck tomato growers, foresee an almost total loss this season of one of the State's highest ranking cash crops, unless hot, dry weather prevails soon to check the worst attack of tomato blight in twenty years.

Hardest hit are eastern counties, where producers are suffering complete crop failures, according to S. B. Fenne, plant pathologist. "Many canners," said Mr. Fenne, "who would normally be engaged putting up this season's pack, will not even open. Conditions are very serious, and though preliminary reports show the disease is generally distributed over Virginia, it is too early to estimate the actual dollar loss."

Reports from market and home gardeners in middle and western sections, where the disease was especially destructive last season, indicate widespread damage in nearly every tomato-producing locality.

Early-maturing eastern tomatoes, providing an extensive trade in "green wraps" to northern metropolitan markets, were hit by the blight, causing losses mounting into thousands of dollars for handlers and growers alike.

"We anticipated an excellent tomato crop this season," Mr. Fenne said, "and one that promised to be very satisfactory from the standpoint of prices, but if the weather remains damp, and light showers continue to keep the foliage wet day and night, our expectations will be exactly reversed. A sudden change to hot, dry weather would check the disease, however, and greatly reduce the loss." -- Virginia Agricultural Extension Service, Virginia Polytechnic Institute and U. S. Department of Agriculture Cooperating. From Press Release, July 12.

TOMATO LATE BLIGHT IN DELAWARE CHECKED BY WEATHER

By J. W. Heuberger

Since the earlier report [PDR Suppl. 164] the situation on late blight of tomatoes has rapidly changed for the better.

The last rain that we had occurred on Friday, July 12, and since then we have had some hot weather. Surveys over the State made during the week of July 15 show definitely that very little new infection has occurred and that the blight lesions are not sporulating as abundantly as during the first two weeks of July. Sporulation is much less in sprayed or dusted fields than it is in untreated fields. In view of this, I believe that the fungicide treatments have played a part in control of late blight by reducing sporulation. This coupled with the hot weather of the past seven days has really slowed late blight down. In fact, the situation looks so good at the moment that we now are estimating a 75 percent pack in Delaware as compared to an estimate of a 25 percent pack made last week.

I believe that we have passed the crisis with this disease in Delaware, except if we get a prolonged wet, cool spell. There is apt to be a second crisis in September on late tomatoes. -- University of Delaware, July 20.

LATE BLIGHT ON POTATO AND TOMATO IN KENTUCKY

By W. D. Valleau

Late blight caused extensive damage to early crop potatoes of eastern Kentucky, and is now causing foliage blight on tomatoes in central Kentucky and foliage and fruit injury in eastern Kentucky. -- Kentucky Agricultural Experiment Station. July 18.

RESISTANCE OF TOMATO VARIETIES TO LATE BLIGHT IN SOUTH CAROLINA

C. F. Andrus

An exceptionally good opportunity to observe the reaction to late blight (Phytophthora infestans) of a fairly large collection of tomato varieties resulted from a severe epidemic which occurred in our field plots at the end of May, 1946. Although Richards and Barratt[1] found no tomato variety to be highly resistant in their artificial inoculations, the recent field tests indicate that a very practical degree of resistance to late blight does occur in some commercial varieties. Also there is a definite possibility that a different strain of the late blight organism was concerned in this epidemic occurring this year. The following list of varieties is by no means complete but includes all that we happened to have in our plots at the time:

Resistant to late blight:	Susceptible to late blight:
Adelaide Dwarf	Agassiz
Australian Earliana	Bonny Best
Burwood Prize	Bounty
Chemin Early Red	Earliest and Best
Danish Extra Early	Early Paris Market
Determinate Shipper	Express
Dobbie's Champion	Grothen Globe
Dobbie's Holyrood	Gulf State Market
Dwarf Earliest Red	Indiana Baltimore
Garden State	Master Marglobe
Marvana	M12 Marglobe (Stokes)
Potentate	Olympia
Primrose Gage	Pan American
San Marzano	Pearl Harbor
Ventura	Pennred
Vetomold	Red Marhio
Westlandia	Pride of the Market
	Rutgers
Some resistance to late blight:	Scarlet Dawn
	Stokesdale
Devon Surprise	U. S. 24
Kondine Red	Valiant
Norduke	
Pritchard	
Tatinter	

---

1 Richards, M. C., and R. W. Barratt. A partial survey of the genus Lycopersicon for resistance to Phytophthora infestans. USDA Plant Dis. Reptr. 30(1): 16-20. 1946.

There were important differences in degree of resistance among the "resistant" varieties; however, this difference was thoroughly confused by the factors of bush type and earliness. Hence we do not feel that a finer classification is justified on the basis of a single test.

U. S. DEPARTMENT OF AGRICULTURE, REGIONAL VEGETABLE BREEDING LABORATORY, CHARLESTON, SOUTH CAROLINA

SCLEROTINIA SCLEROTIORUM ON POTATOES ON LONG ISLAND

John S. Niederhauser

Sclerotinia sclerotiorum was found in two adjacent fields of potatoes on the South Fork of Long Island on June 26. This pathogen has been previously reported to cause loss in potato fields in Florida (Eddins, A. H. Sclerotinia rot of Irish potatoes. Phytopath. 27: 100-103. 1937). But its occurrence on potatoes as far north as New York State is considered uncommon, even though the pathogen is generally present in this area.

The disease was observed in two adjacent fields near Bridgehampton, with about 4 percent of the plants affected. No attempt was made to determine how widespread the trouble was in the area.

The principal symptom is a general wilting of the entire plant or of a single stalk in a hill. The stem was attacked at or just above the point where it entered the soil, and there were indications that a wound or injury had provided the infection court.

The lesion is watersoaked in its early stages. As it enlarges the margins remain watersoaked and the central portion turns dark brown. When observed in the field, the whitish mycelium of the fungus was prominent on the surface of the lesion. The characteristic sclerotia were found imbedded in the rotted tissue.

While no apothecia were found, it is presumed that these fruiting bodies were the source of inoculum. Cultures of the causal fungus show it to be Sclerotinia sclerotiorum rather than S. minor or S. intermedia.

In accordance with the observations made by Dr. Eddins in Florida (l. c. p. 102) cool rainy weather had provided favorable conditions for the development of the disease on Long Island, and the disease appeared more severe on low ground.

NEW YORK STATE COLLEGE OF AGRICULTURE
July 12, 1946

VEGETABLE DISEASES IN EASTERN VIRGINIA

Harold T. Cook

SNAP BEAN Halo blight (Pseudomonas phaseolicola) has been destructive in a relatively small number of commercial bean fields although low temperatures and frequent rains have been especially favorable for it to develop. In at least one case the disease was correlated with the planting of second choice seed. It would appear that most of the seed stock used in this section this year was relatively free of blight.

CANTALOUP Plants in one 9-acre field near Norfolk are badly affected with Macrosporium blight [Alternaria cucumerina]. Lack of the disease in adjacent fields and the prevalence of the disease near the crown of the plant indicate seed-borne infection.

Downy mildew (Pseudoperonospora cubensis) has developed in a few fields during the last ten days. It has not been as destructive as would be expected considering the wet season.

VIRGINIA TRUCK EXPERIMENT STATION, NORFOLK
July 15, 1946

SHORT REPORTS ON DISEASES OF VEGETABLE CROPS

SPOTTED WILT ON LONG ISLAND

By Charles M. Wright

Spotted wilt, though present for a number of years on Long Island, apparently has not been reported in the literature from that area. On June 7, 1946, it was observed on tomatoes and peppers in two fields near Greenport. Symptoms produced on tomatoes were characterized by cessation of growth, bending downward of all leaves and rolling of leaflets. Some bronzing was observed on terminal leaflets. There was no necrosis. Peppers showed a tip necrosis and wilting. An estimated 35 percent diseased pepper and tomato plants were found in one of the fields. These plants had been procured from a local greenhouse. An inspection of the greenhouse revealed that calla plants were infected with the spotted wilt virus and probably served as the source of inoculum. Thrips which are known to transmit this virus were found feeding on the diseased calla. Infected tomato seedlings found in the greenhouse displayed striking veinal bronzing to blackening but none of the other symptoms described above for tomatoes growing in the field. -- Department of Plant Pathology, Cornell University, Ithaca, New York.

CUCUMBER ANGULAR LEAF-SPOT ON THE MARYLAND EASTERN SHORE

By C. E. Cox

Angular leaf-spot (Pseudomonas lachrymans) was severe on cucumber seedlings in a number of fields in Wicomico County, Maryland visited on June 10. As high as 90 percent of the plants in some fields were affected. There is evidence that the organism may have overwintered in the soil. Very rainy weather during and immediately after emergence of the seedlings has probably contributed to severity of the disease. -- University of Maryland. June 18, 1946.

POTATO LEAF ROLL IN MARYLAND

By R. A. Jehle

The first inspection of potatoes for certification has just been completed in Garrett County, Maryland. Large percentages of plants infected with leaf roll (virus) were found in all fields in which home-grown seed was planted. The number of plants infected with leaf roll varied from 15 percent to 98 percent and many of the fields had over 50 percent. This condition was found to prevail in all potato growing areas in the county. Judging from this condition there must have been a tremendous spread of leaf roll last year since some of the severely infected fields were grown from seed which was certified in 1945. Garrett County potato growers are being advised to sell their crop for table stock and purchase new seed to plant their 1947 crop. -- University of Maryland. July 11, 1946

NOTES ON SOME VEGETABLE DISEASES IN IDAHO IN 1945

Glenn KenKnight

An unusually wet spring in 1945 in southern Idaho resulted in the re-occurrence of onion mildew, asparagus rust, and an apparently first report of lettuce anthracnose. Curly top was more prevalent than in any year since 1941. However, aster yellows, which had declined steadily in incidence since 1942, became almost a rarity. Sclerotinia did much less damage than in 1944. A virus-like disease, perhaps yellow dwarf, was found to be prevalent on the onion seed crop in Canyon and Twin Falls Counties.

Asparagus: Rust (Puccinia asparagi) was common on escaped asparagus along roadsides near Greenleaf in Canyon County.

Cucumbers: Curly top (virus) ruined three fields of cucumbers near Lewiston, whereas other fields in that area escaped damage. In all three cases where the damage occurred, the field was close to a patch of Russian thistle, a favorable over-wintering host for the sugar beet leaf hopper. A low percentage of cucumber mosaic (virus) was noted in most of the fields encountered.

Carrots: Bacterial blight (Xanthomonas carotae) was present in all of the 20 carrot seed fields examined. However, damage from blasting of florets appeared to be considerably less than in 1944. Some aster yellows (virus) occurred in most fields with the highest counts of affected plants 8 percent in a field near Nampa and 12 percent in a field near Twin Falls. Green dwarf (undetermined) was noted in only one field, near Twin Falls, and there only a few affected plants were found. Sclerotinia, bacterial soft rot (Erwinia carotovora), gray mold (Botrytis cinerea), and black rot (Alternaria radicina) were noted in descending order of frequency on decaying roots.

Lettuce: Anthracnose (Marssonina panattoniana) was common on wild lettuce in some areas along roadsides near Greenleaf. A trace of the disease was noted in two fields of spring lettuce. A trace to 4 or 5 percent of mosaic (virus) was observed in several seed fields. Watery soft rot (Sclerotinia) was widespread but very low in incidence. In seven seed fields encountered only three plants affected with aster yellows (virus) were noted.

Onions: Downy mildew (Peronospora destructor) was noted in trace amounts in two seed fields near Wilder, and with nearly 100 percent incidence and severe damage in two small patches near Boise. One seed company representative reported heavy loss from mildew in three of his fields near Boise. Severe reduction in stand from neck rot (Botrytis spp.) was noted in one onion seed field near Wilder and in another near Caldwell. Root rot (Fusarium, at least in part) was common in the seed crop and occasionally severe.

Close attention was paid to a disease of the onion seed crop first noted at Parma by Dr. Earle Blodgett. The disease resembles yellow dwarf (virus) but its identity with the latter was not demonstrated. Affected plants were severely stunted, and seed stalks were often, and leaves occasionally, striped with longitudinal yellow bands. The leaf walls were thinner than normal and the leaves were limp in comparison to the turgid leaves of normal plants. There was abundant curvature of the seed stalks in some fields, in plants both with and without the yellow stripe symptom. However, curvature of the seed stalks appeared in the absence of the yellow stripe symptom and vice versa. The two conditions appeared to be unrelated. When first observed early in June many of the plants with the yellow stripe symptom were less than one-fourth normal size. They recovered somewhat but remained subnormal in size. The yellow stripe persisted in some plants until maturity and

even after the leaves died, but in general, the disease became less conspicuous as the season advanced. Affected plants produced smaller umbels and less seed than normal plants.

The disease was noted in 11 of 18 fields in the Greenleaf-Wilder-Parma area, varying from 2 to 95 percent incidence. No trace was found in any of 12 fields in the vicinity of Nampa, and only one affected plant in 12 fields in the Homedale-Marsing area. The disease was present in 3 of 7 fields near Twin Falls, with 62 percent of the plants conspicuously yellow striped in one field of Michigan Yellow Globe. A few affected plants were found in each of two fields near Wendell. Scattered onion seed fields were noted elsewhere in the State, but the disease appeared to be absent. The disease was not noted on the Sweet Spanish varieties, and the figures above do not include Sweet Spanish. It was observed on Ebenezer, White Portugal, Clark's White Globe, Danver's Yellow Globe, and Brigham's Yellow Globe.

On the Wilder Bench, where the disease is now well-established, onion seed crops have been grown for 20 years. Many of the growers have no seed contract. One seed company representative stated that he had noted the symptoms for five years but had considered it "genetic striping" and of no importance. However, he made a practice of shipping a large share of his bulbs for planting from California because he obtained better yields from California than from Idaho bulbs. Most seedsmen who had not encountered the disease stated that they preferred locally-grown bulbs. Two of the fields on the Wilder Bench that were free from the disease were produced from California grown bulbs.

Peas: Aphanomyces root rot (A. euteiches) caused from heavy damage to complete ruin on about 2000 acres of peas near Grangeville. This includes most of the same area where the disease ruined 800 acres two years earlier. Many growers practiced alternate cropping of peas and wheat. Bacterial blight (Pseudomonas pisi) was noted as severe in one field of canning peas in Canyon County following a hail storm. Powdery mildew (Erysiphe polygoni) was much less conspicuous than in 1944.

Parsnips: Mosaic (virus) was noted on about 5 percent of the plants in a field for seed at Craigmont. Affected plants were one-third to two-thirds normal size with puckered and mottled leaves when first noted May 30, but later the leaf symptoms became inconspicuous and the plants attained nearly normal size. In the same field another 5 percent of the plants were extremely dwarfed, being one-eighth to one-third normal heighth May 30. The plants were abnormally deep green and rigid, with puckered leaves and short internodes. Later in the season these plants were not found. Whether they recovered or died was not determined. In May eight roots of affected plants were topped and transported to Moscow. They survived and reproduced the symptoms. Transmission to seedlings by the carborundum method was unsuccessful.

Rape: White blight (Sclerotinia) was noted in trace amounts in a few fields in northern Idaho.

Turnips: Mosaic (virus) was noted (4 to 12 percent incidence) in four seed fields near Troy. The disease was not observed in southern Idaho.

Formerly IDAHO AGRICULTURAL EXPERIMENT STATION

TOBACCO BLUE MOLD (DOWNY MILDEW) IN VIRGINIA - 1946

S. B. Fenne

Tobacco blue mold [Peronospora tabacina] was first officially reported on April 3 in Pittsylvania County, by Dr. W. A. Jenkins, of the Chatham Tobacco Research Laboratory. On April 5, blue mold was observed in Mecklenburg County. This infection appeared to be several days old, and it is quite likely that the disease had been present for several days at that time. During the following two weeks, weather remained cool with considerable humidity. Tobacco plants were very small, most of them being in the square stage. Blue mold developed in about 20 percent of the beds without causing much apparent injury. The weather then turned dry and blue mold discontinued active development for the time being.

About two weeks before the plants were ready to be transplanted to the field, or about April 20, a period of exceedingly wet weather set in. Humidity and temperatures were ideal for the development of blue mold. Within the next two weeks, the disease could be found in practically every tobacco bed visited in the eastern tobacco belt; and in many untreated beds severe loss occurred.

Because of the severe blue mold epiphytotic of 1945, plans were made to start an active campaign for blue mold control in January, using Fermate as a spray. Through close cooperation with the manufacturer of this fungicide, approximately 75 dealers were set up in the tobacco area. Ample quantities of Fermate were supplied these dealers, and the material was available in many small country stores in most counties. Because of the severe shortage of spraying equipment, it was impossible to secure an adequate supply of good sprayers. In most cases, therefore, it was necessary to rely on small 3-gallon knapsack compressed-air sprayers. Wherever possible, however, bucket and barrel sprayers were used.

During the numerous meetings held prior to the outbreak of blue mold, Kodachrome slides were used to illustrate the disease, and to show the results that had been obtained during the previous year in our spray

demonstrations. Several of our meetings had from 700 to 2000 farmers in attendance. Many of these meetings were worked up in cooperation with the various chambers of commerce and civic groups in the tobacco area.

As a result of the extension program in blue mold control, it has been conservatively estimated by county agents and tobacco specialists that over 50 percent of all tobacco growers in the Eastern Virginia belt sprayed their plant beds with Fermate. Approximately 250,000 pounds of Fermate were sold in the tobacco area; however, a considerable part of this amount was not used since many farmers were afraid that there would not be a sufficient supply available and, therefore, purchased two or three times as much material as they actually needed just because it was available.

Many farmers sprayed their beds well and followed directions. There were, of course, many cases of peculiar interpretation of instructions. However, at least 90 percent of the farmers who used Fermate reported beneficial results. Where it was used properly and with good equipment, uniformly excellent results were obtained. Some blue mold appeared in many of the sprayed beds. However, no damage resulted and plants were available to set in the field when wanted. From 25 to 50 percent of the plants in unsprayed beds were killed by blue mold in many cases. In practically all other cases, if the plants were not killed, they were delayed about two weeks before they could be transplanted.

During 1945, thousands of Virginia farmers had to go to the Carolinas for plants because of blue mold. As a result of our program this year, Virginia had an ample supply of good plants at the proper time. There was a large surplus of tobacco plants from sprayed beds that more than met the demand for plants from farmers who did not spray their beds. In the reports that are now coming in from approximately 100 result demonstrations carried on during 1946, the demonstrators report complete satisfaction with the program. In almost every case, they reported that they expected to spray their beds again next year.

Fifteen result demonstrations were set up, using Fermate dust, for the control of blue mold. Most of the growers using this material reported excellent results with it. It was more convenient to use and quicker to apply. This was especially true where tobacco beds were located at a considerable distance from the house and where water and spray materials had to be hauled or carried long distances. Fermate dust can be blown through the plant bed covers very effectively by using a rotary type hand-duster. Blue mold control seemed to be equally as good from dust as from spray applications.

VIRGINIA POLYTECHNIC INSTITUTE
June 21, 1946.

A SCLEROTINIA DISEASE OF LUPINE IN FLORIDA

Phares Decker

Blue lupine (Lupinus angustifolius L) was introduced into Florida through the cooperation of the United States Department of Agriculture and the Florida Agricultural Experiment Station. First grown at Gainesville, Florida, it was increased by the North Florida Station at Quincy and has become a profitable winter legume cover and seed crop in North Florida and has gained popularity in the southern parts of Georgia and Alabama.

During the winter growing season of 1945-46, a disease caused by a Sclerotinia was observed causing some damage to blue lupine in localized areas in Florida. The disease found in field plantings in the Quincy area killed 85 percent of the plants in a few local areas before the seed crop was mature. A lower percentage of diseased plants was observed in lupine plantings around Marianna and Monticello, while the disease was not found in the Gainesville area.

The disease appeared on lupine plants in the field in January at about the same time as the Botrytis disease described by Weimer (Phytopath. 33:319-323. 1943). The two diseases resemble one another in that both attack the lupine plant anywhere above the ground line, causing the portion of the plant above the diseased area to wilt and die. Later in the season, new infections may occur higher up on the main stem or on the lateral branches. Sclerotinia, unlike Botrytis, produces no germinable conidia. Apothecia have not been seen but they are believed to occur because many plants were attacked far above the ground line over an extended period of several months. Sclerotia of both Botrytis and Sclerotinia were found on or in the diseased plants. The sclerotia of Botrytis were usually found attached to the plant near the diseased area, while those of Sclerotinia were usually within the plant, often completely filling the pith cavity for some distance up and down from the diseased area.

In a lupine field saved for a seed crop, many pods were attacked by the Sclerotinia. The mycelium was found inside the pods growing in and on the seed. Some seeds had reached mature size and were free of the organism while others had been killed before maturity and were filled with mycelium and sclerotia. Some seeds were replaced by the sclerotia. The sclerotia vary from a few millimeters up to the size of the mature lupine seed. These sclerotia were combined along with the lupine seed and unless they are removed in the drying and cleaning operations may be carried with the seed and serve as a source of inoculum for the new lupine crop.

Gould (Proc. Iowa Acad. Sci. 46 (1939): 119-125, 1940) lists Sclero-

tinia as causing a wilt of cultivated lupine, and a reference to a disease of lupine caused by Sclerotinia sclerotiorum is found in the Scientific Annual Report of the National Biological Institute for Agriculture and Forestry, 1940 (abstracted in Rev. Appl. Mycol. 22: 161. 1943). No report that the sclerotia occur in the seed pods of lupines has been found.

The Sclerotinia disease of lupines in Florida, while apparently not widespread, is capable of causing severe losses to the lupine crop. The disease may spread by natural means, and there is opportunity of distributing it with the seed. Because of this it is suggested that seed dealers and growers exercise great care in cleaning the seed to remove the sclerotia and infected seed.

FLORIDA AGRICULTURAL EXPERIMENT STATION

CEREAL RUSTS IN KANSAS IN 1946

C. O. Johnston

The crop season of 1946 has had many unusual features, some of which favored cereal rust development while others were definitely unfavorable. The winter was extremely mild and dry. Some spring wheat varieties survived well from fall sowings. Spring growth started early and was hastened by a long period of warm weather in March and April. Some winter wheats began heading by April 22, the earliest on record. By May 1 the crop development was fully two weeks ahead of normal. Cool weather in May, especially cool nights, delayed crop development somewhat but the wheat crop still is ahead of normal and harvest has begun in southern Kansas.

A severe freeze occurred in the western half of the State on May 10 and 11. Temperatures dropped to 23-28° F. Early wheat that was headed at the time was severely damaged in some localities. The damage was very erratic, however, and the over-all picture does not seem to be as serious as was at first feared.

On a trip through southeastern, south central, and central counties on June 3, 4, and 5, fields of winter barley were seen in the shock, some oats were being bound, and early wheat varieties were nearly ripe. High, drying southwest winds have blown steadily now for six days and temperatures at Manhattan have risen to 100° F. There was very light rainfall in April and May and none has fallen thus far in June. Drought conditions are developing rapidly.

WHEAT Leaf rust of wheat [Puccinia rubigo-vera var. tritici] overwintered in moderate abundance in the eastern half of

Kansas and developed to a heavy infection in southeastern and south central counties. By June 1 infection was very heavy in the eastern half of the State but it seems to have resulted in less damage than in 1945.

Stem rust on wheat [P. graminis] is present in the smallest amount recorded in several years. Even in southern counties, only bare traces were seen on June 3, 4, and 5. At Manhattan light infections can be found on late wheat in nursery sowings but farmers' fields are almost free of stem rust. No stem rust has been reported from western Kansas.

BARLEY Leaf rust on winter barley [P. anomala] is fairly heavy at Manhattan and in southeastern counties but is light in the south-central part of the State. Elsewhere the crop is practically rust-free. No stem rust has been seen on winter barley and all spring barley seen has been rust-free. Winter barley again is making an excellent crop.

OATS The oat crop in Kansas is the best in years and the writer has not seen oats so free from rust in years. Bare traces of crown [P. coronata] and stem rust were seen in southern Kansas on June 3 and 4, but elsewhere the crop was rust free. At Manhattan it has been exceedingly difficult to produce heavy infections of crown and stem rust on oats even by the best rust nursery methods. A large portion of the Kansas oat acreage is sown to rust-resistant varieties such as Boone, Tama, Vicland, Osage, and Neosho.

RYE Rye acreage is small in Kansas this year and the crop is in good condition. Light leaf rust [P. rubigo-vera var. secalis] infection on rye was observed in a few localities but the damage is negligible.

DIVISION OF CEREAL CROPS AND DISEASES

A SUMMARY OF THE 1946 STRAWBERRY RED STELE SITUATION IN MARYLAND

W. F. Jeffers and R. A. Jehle

Temperature and moisture conditions on the lower Eastern Shore, during the fall of 1945 and the following winter were very favorable for a severe outbreak of red stele [Phytophthora fragariae] in the spring of 1946. The very heavy July and August rains had flooded much of the low ground and caused an abundance of water to be available for the fall and winter. Also the winter months were quite moist and the spring temperature was in general favorable for infection by the red stele organism.

Inspection of strawberry nurseries began on March 1 and ended on April 10, 1946. Owing to a shortage of plants and to high prices, many berry growers offered plants for sale. Of 284.3 acres grown by regular nurserymen, 4.3 acres or 1.5 percent were condemned due to red stele. For berry growers and other persons requesting inspection there were 151.2 acres inspected with 36.6 or 24.2 percent condemned due to red stele. Total acres inspected amounted to 435.5 with 40.9 or 9.39 percent condemned. This high percentage of red stele infection in berry growers' fields followed the same trend as for previous years (PDR 29: 606-611).

This season red stele was found for the first time in the newly introduced Temple variety. In most cases this berry showed very high resistance; producing up to 250 crates (24 qt. size) per acre while ordinary varieties adjoining Temple were total losses. However, in three fields Temple showed enough susceptibility to be definitely stunted in several small, very wet spots. The Temple variety is apparently especially adapted to the low, moist soil found on the Eastern Shore of Maryland, for there it is a good commercial berry while in drier soils it does not perform well.

In a test planting, one plant of the Aberdeen variety was found that showed typical red stele symptoms.

UNIVERSITY OF MARYLAND

OBSERVATIONS ON SOME SPECIES OF TAPHRINA

A. J. Mix

Rains have been frequent in eastern Kansas this spring and several species of Taphrina have been abundant. Cases of secondary infection by the peach leaf-curl fungus (Taphrina deformans) were observed on May 27, being evidenced by very young lesions on apical leaves of well grown twigs, the leaves that had shown primary curl having fallen more than a month earlier.

Taphrina farlowii on foliage of Prunnus serotina was found south of Vinland, Kansas, on May 7. Mature asci were present. This wild cherry sets very little fruit in this locality and matures even less. Young fruits were being shed on this date. The diseased trees were visited weekly and on May 27, some of the remaining fruits were found to show "pockets" with mature asci. On the same date young curl-lesions were evident on leaves in the inner and lower parts of the trees, apparently having become infected by spores shed from leaves higher up. It is believed that the fruits had been infected in the same manner.

Somewhat similar behavior of this fungus was reported to the writer in 1943 by Dr. V. H. Young (in correspondence). He had found (near Fayetteville, Arkansas) T. farlowii on leaves and very young fruits of P. serotina early in the season and, after these had been shed, observed new curl-lesions developing on younger leaves. (He also reported like observations on peach leaf-curl.)

In this connection it is recalled that in 1942 near Boulder, Colorado, leaf-curl (Taphrina confusa) of Prunus demissa was observed in early stages of development some time after fruit "pockets" on the same trees (T. confusa) had been shed.

Apparently late primary infections and secondary infections by these fungi occur more commonly than most of us realize.

Taphrina caerulescens (the -ae is Desmazières' original spelling) has been known in this area only on Quercus marilandica and only at one station, near Baldwin, Kansas. This year it was found in the Vinland locality mentioned above on Quercus marilandica, Q. muhlenbergii (a new host for this fungus), and Q. velutina. At "Hole in the Rock", a few miles to the southwest, it was abundant on Q. marilandica but not present on Q. velutina. Further north, near Lawrence, a single tree of Quercus macrocarpa, standing alone in a meadow, was heavily infested, while several trees less than a quarter of a mile away had healthy foliage; and in a large grove of burr oaks half a mile to the east, only one infested tree was found.

Careful search for Taphrina caerulescens on these and other oaks was made north and northeast of Lawrence by R. L. McGregor while collecting higher plants in Douglas, Leavenworth, and Atchison Counties; but the fungus was not found. Apparently the localities mentioned above mark the northern limit of present distribution of T. caerulescens in this area. One is tempted to conjecture a recent northward migration of this fungus from the Ozarks, but nothing is known about its possible occurrence in Kansas south and east of Douglas County.

The infestation on Quercus muhlenbergii was light, and confined to one tree. Nearby trees of Q. marilandica were heavily infested, suggesting the transfer of the fungus from that host to Q. muhlenbergii. But morphologically, the fungi on these two oaks are quite different, the asci borne on Q. muhlenbergii being about half the size of those on Q. marilandica (32-58 μ x 18-22 μ for the former, and 53-103 μ x 11-26 μ for the latter), and possessing broad, flattened bases with rhizoidal extensions, in contrast to the narrower (though often rhizoidal) bases of asci occurring on Q. marilandica. This is in accord with the observations of Mrs. Thompson (Univ. of Kansas Sci. Bull. 26: 357-366. 1940) who found considerable morphological variation of this fungus from one host-species to another.

Perhaps the occurrence of T. caerulescens on Q. muhlenbergii is rare. It was not observed by the writer last year in Delaware where this oak is abundant, though it was found commonly on several other species of oaks.

Localization in distribution of various species of Taphrina on wild hosts has often been noticed. It is well exemplified (in this and other years) by Taphrina communis on Prunus americana. Certain thickets of this wild plum regularly show "pockets" in abundance; others produce only healthy fruits. Perhaps this is due, at least in part, to "varietal" resistance. A more or less isolated thicket of P. americana on the University of Kansas campus has borne healthy fruit each year for several years, in fact ever since any of the trees were old enough to bear. Inoculations have been made on these trees in three different seasons but no infection resulted.

Also on the University of Kansas campus, in an ornamental planting of P. americana there are two bearing-trees. One of these usually shows plum pockets while the other, directly across the sidewalk, has always borne healthy fruit. This "resistant" tree must have received inoculum from its neighbor year after year. Of further interest is the fact that in 1943, a very dry spring, the susceptible tree showed no "pockets", but was heavily infected in 1944 when the weather was favorable. Such survival of inoculum for more than one year has been several times observed in Taphrina deformans.

DEPARTMENT OF BOTANY
UNIVERSITY OF KANSAS

BRIEF NOTES ON PLANT DISEASES

DISEASES OF WHEAT AND OATS AT DENTON, TEXAS, JUNE 15, 1946

By I. M. Atkins

Stem rust did not become an important factor in yield, though all spring oats and many fall sown fields became generally infected before harvest. Very cool weather and frequent rains until maturity allowed grain to mature without damage from rust. Stem rust did not become general on wheat for these same reasons, in fact even where inoculations were made we did not get good infection. Helminthosporium rootrot of oats was of some importance on Fultex oats in this area again. It appears that this disease may cause rapid reduction in Fultex acreage in this area. The Red Rustproof types are less susceptible. -- Division of Cereal Crops and Diseases.

RUST ON RED CLOVER IN KANSAS

By C. O. Johnston

An interesting rust observation for Kansas was the finding of a heavy infection of rust [Uromyces trifolii var. fallens] on red clover in experimental sowing in Neosho county. Although not widely grown in the State, red clover is grown to some extent in southeastern counties. In the plots observed, rust infection was very heavy on the leaflets, petioles, and stems. A combination of heavy infections of rust and mildew [Erysiphe polygoni] was causing the leaves to dry prematurely. -- Division of Cereal Crops and Diseases, Manhattan, Kansas. June 10, 1946.

BOXWOOD WILT IN MARYLAND

By C. E. Cox

Boxwood wilt or die-back (Volutella buxii) is unusually prevalent on both American and English boxwood in Maryland this year, probably as a result of severe winter-killing followed by unusually rainy weather during the late spring and early summer. -- University of Maryland. June 18, 1946

OBSERVATIONS ON ECONOMIC PLANT DISEASE FUNGI AND WEATHER AT ALLAHABAD, INDIA, DURING THE 1945-46 CROP SEASONS

Edgar F. Vestal

Fewer plant diseases were observed on the major crop plants during 1945-46 crop seasons than is considered normal for the Allahabad area of the Jumna-Ganges Valley. Many appeared later than usual and thus were of little economic importance. Some normally saprophytic or only mildly parasitic organisms became actively parasitic. It appeared from the very beginning that the weather was an important factor in the activity of the fungi.

Weather data collected at the Agricultural Institute farm include rainfall, temperature (maximum-minimum), humidity, and wind direction. Rainfall, humidity and temperature data for the months of June to March, inclusive, have been taken from the Agricultural Institute records for the crop seasons (June to March) of 1940 to 1946. These data are presented in Tables 1, 2, and 3, and graphically represented in Figures 1 to 3.

Rainfall for the kharif season (June to October) was below the 6-year average for all months except October. Relatively heavy rains fell during short periods only in July and August. (Fig. 1)

The humidity remained below 70 percent until the third week of August and the season's peak of 83.3 percent was reached the third week of September. The humidity for July and August was 15.89 and 15.18 percent, respectively, below the 6-year average and the monthly average for September was 3.56 percent lower than the 6-year average.(Fig. 3)

Temperature recorded for the months of June, July, August, and September was above the 6-year average. A striking difference in the curves of the 1945 season, as compared with the 6-year average, is that the curve for the 1945 period is upwards for June, July and August, whereas it is descending for the corresponding months for the 6-year average. (Fig. 2)

During the period from June to September, 1945, there was much less activity on the part of the leaf spotting fungi than in former years. Low humidity and high temperature no doubt tended to retard the activity of such fungi as Cercospora, Phyllosticta, Colletotrichum, Alternaria and others. On the Allahabad Agricultural Institute farm the fungi mentioned were not abundant enough to furnish class material in season. Unofficial reports from Benares, some 75 miles east of Allahabad, were that sann hemp (Crotalaria juncea) was severely damaged by a species of Cercospora but search of all plantings on the Institute

Table 1. Total rainfall in inches for months of June to March for crop seasons 1940-46 inclusive at Allahabad, India.

Year	June	July	August	September	October	November	December	January	February	March
1940-41	0.80	4.37	14.72	5.60	0.19	0.02	0.00	1.03	0.20	0.00
1941-42	2.74	5.72	5.28	8.65	0.04	0.00	0.00	3.96	4.30	0.36
1942-43	4.52	7.10	9.98	8.22	0.00	0.00	0.16	0.57	0.22	0.00
1943-44	0.80	8.29	19.78	8.78	0.74	0.00	0.00	0.00	4.58	4.38
1944-45	1.09	8.64	19.04	4.98	2.08	0.00	0.90	2.00	0.00	- --
1945-46	1.21	5.62	11.65	2.91	2.97	0.00	0.00	0.00	1.00	0.00
Average	1.86	6.61	13.41	6.52	1.003	0.003	0.176	1.26	1.71	0.95

Table 2. Mean temperature in degrees F. for the months June to March for the crop seasons 1940-46 inclusive at Allahabad, India.

Year	June	July	August	September	October	November	December	January	February	March
1940-41	93.72	83.38	83.19	83.45	80.50	69.48	63.00	60.78	64.64	75.95
1941-42	89.60	86.40	83.70	83.20	80.10	67.63	62.22	59.76	64.80	75.60
1942-43	94.34	83.75	82.38	81.72	78.50	68.23	60.85	66.07	63.14	75.92
1943-44	92.88	85.63	80.80	83.50	76.84	67.89	61.28	60.54	62.54	73.70
1944-45	82.65	86.95	81.33	79.45	74.62	68.38	62.60	59.56	68.19	
1945-46	84.30	85.90	86.32	82.75	75.92	65.66	59.70	61.91	64.34	72.45
Average	89.58	85.33	82.95	82.34	77.75	67.54	61.61	61.34	64.61	74.72

Table 3. Average humidity in percent for the months of June to March for the crop season 1940-46 inclusive, at Allahabad, India.

Year	June	July	August	September	October	November	December	January	February	March
1940-41	48.30	78.00	83.70	73.50	58.00	52.20	71.80	78.96	66.38	41.55
1941-42	63.56	70.36	83.62	83.20	80.10	53.42	67.96	80.22	77.65	59.96
1942-43	49.08	86.24	79.25	79.52	76.08	74.00	81.03	81.77	75.70	51.59
1943-44	56.89	72.60	93.24	88.00	86.95	73.89	79.84	81.62	81.66	78.80
1944-45	54.70	89.60	88.55	78.76	78.86	69.83	53.80	58.60		
1945-46	53.00	60.65	67.47	76.12	75.50	67.44	60.20	58.30	65.89	52.68
Average	54.25	76.24	82.64	79.68	75.97	65.13	69.44	73.24	73.25	56.87

Fig. 1. Total rainfall for crop season of 1945-46 compared with that of the 6-year period of 1940-46 inclusive, at Allahabad, India.

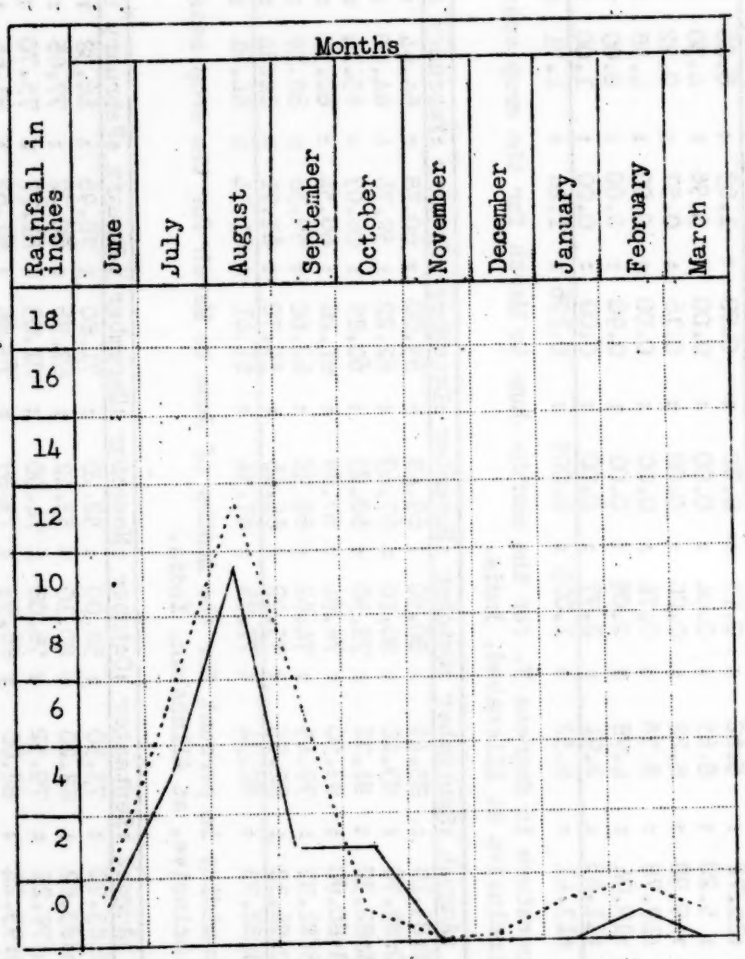


Fig. 2. Average temperature in degrees F for crop season 1945-46 compared with that of the 6-year period 1940-46 inclusive, at Allahabad, India.

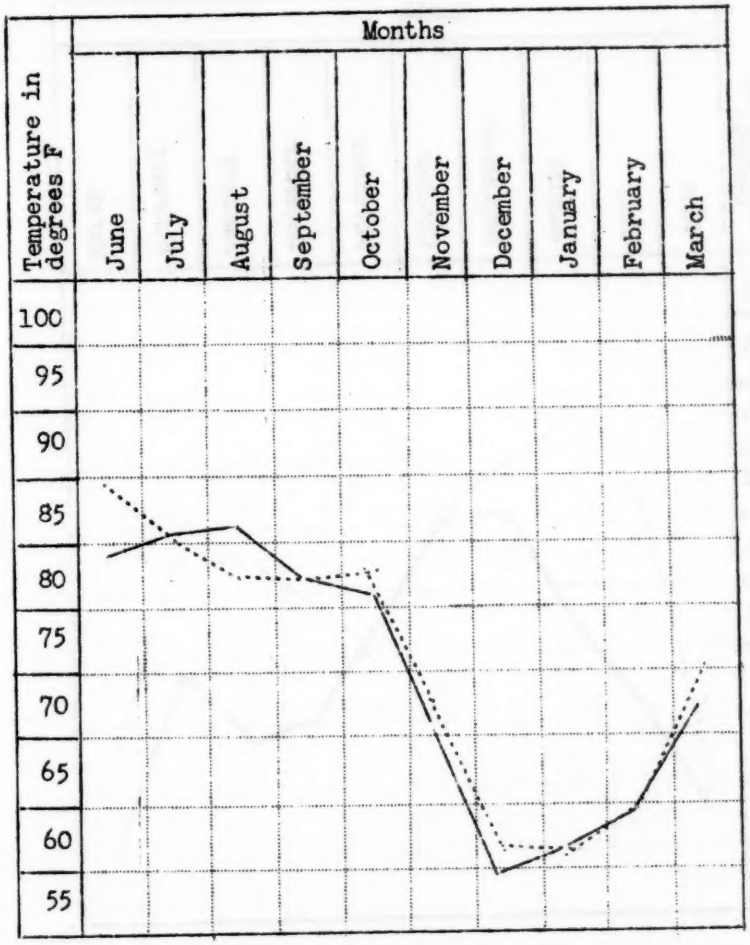
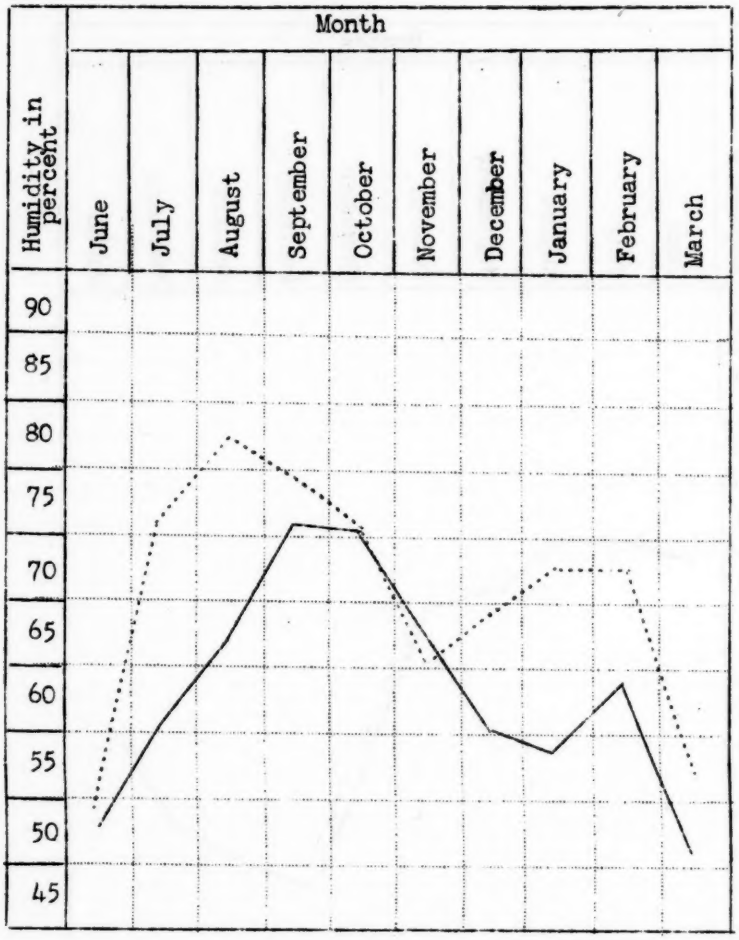


Fig. 3. Average humidity in percent for crop season 1945-46 compared with that of the 6-year period 1940-46 inclusive, at Allahabad, India.



1945-46 season _____

1940-46 average .. ..

farm failed to show a single infection. This would indicate that the conditions at Allahabad were extremely local.

While the ordinary leaf spotting fungi were inactive, some of the ordinarily saprophytic fungi were unusually active. Species of Choanephora, normally saprophytic, or at most mildly parasitic, became abundant everywhere. Usually these fungi are found on the petals and very young fruits of such plants as okra, eggplant, squash, the pistillate flowers of maize (during rainy weather) and sometimes on the spikes of bajra. But during the months of August and September, 1945, species of Choanephora were found on a variety of plants, including cluster bean (Cyamopsis psoraleoides DC.), alfalfa, peanuts, Amaranthus sp., Hibiscus sp., castor, Crotalaria sp., and wheat seedlings, in addition to the regularly affected plants already mentioned. In many cases the fungus caused leaf infections. Some species of Amaranthus grown in the variety garden were completely defoliated by Choanephora. Castor bean plants nearby had many of their leaves completely destroyed by the fungus. It was found on young wheat seedlings during the first week of October. During the time of greatest activity on the part of the Choanephora (the first two weeks of September) the temperature ranged between 81 and 83° F with the humidity between 76 and 83 percent. Most of the Choanephora examined appeared to be Choanephora cucurbitarum (Berk. & Rav.) Thaxt. These observations lend support to the often made statement that one has only to change conditions and saprophytes become parasites, or vice versa.

The temperature dropped steadily from the middle of September to the middle of October, when it had fallen to 70° F. By that time Choanephora was found only on the blossoms of a few plants such as brinjal (eggplant) and bhindi (okra) but the leaf spotting fungi were becoming active. Cercospora cruenta appeared on mung (Phaseolus mungo L.) and spread so rapidly that by the end of October the plants were completely defoliated. Unfortunately, plant disease records were not kept for the period 1941-44 so that comparisons are not possible, but it is evident that no such combination of rainfall, humidity and temperature occurred during any of these years.

Lowering of the temperature during October, with the corresponding rise in humidity, created conditions favorable for such root rotting fungi as Pythium, Rhizoctonia, Fusarium, Sclerotium, etc. By the middle of October wheat seedlings, in the early plantings, were observed graying at the leaf tips, later becoming wilted, yellow, then turning brown and dying. Examination of the root systems disclosed many to be badly decayed, with many of the smaller ones blackened. Isolations from the diseased roots yielded a Pythium and a Rhizoctonia. The Rhizoctonia appeared identical with R. solani Kuehn. The Pythium only slightly resembled P. graminicolum Subr. which has been reported in India as associated with the discoloration of wheat root and collar rot. The culture of Pythium was turned over to Dr. R. K. Saksena,

Mycologist, University of Allahabad, who has kindly undertaken the identification. Estimation of the seedling loss in the field was 25 percent.

Using sterilized soil and the same wheat variety from which the isolations were made, preliminary experiments were run to determine the pathogenicity of the two fungi. Using 25-seed lots, six lots to a series, trials were made using Pythium alone, Rhizoctonia alone, Pythium and Rhizoctonia together, and untreated. Emergence of the seedlings for the four treatments was as follows: Uninoculated 136; Pythium alone 123; Rhizoctonia alone 127; Pythium and Rhizoctonia together 103. Thus the pot trials approximated the field estimations in percentage loss of the seedlings.

During November and December the garden crops appeared to suffer from disease no more than usual. A trace of anthracnose was found on garden beans. Beets were infected with Cercospora beticola. Tomatoes were infected with a Fusarium species that causes typical yellows. Leaf spotting was caused by species of Alternaria and Cercospora. Mosaic was by far the most serious disease of tomatoes. At the time of this report, May 15, 1946, the tomato plants are 100 percent infected and many of them are not blossoming or setting fruit.

In March of this year a green tomato fruit rot appeared in the fields of the Institute. For a short time it seemed that the entire crop might be lost. The green fruits touching the ground were rotting from the bottom upwards. The skin turned dark and the fruit became soft and pulpy and rapidly collapsed. A whitish mat of mycelium appeared like a collar around the stem of the fruit. Isolations from this region yielded a pure culture of Pythium. Isolations from the lower portion of the fruit yielded a species of Rhizoctonia in addition to the Pythium. Inoculations with pure cultures of the fungi into surface sterilized green fruits yielded the typical rot and other symptoms. Pythium alone would pass through a 2-inch green tomato within 36 hours and by 48 hours would form the typical grayish-white mycelial ring about the stem. This was sufficient evidence that the Pythium was a very active pathogen. The Rhizoctonia, which appeared to be R. solani Kuehn, is much slower in action, complete rotting with pure cultures requiring from 3 to 4 days. Inoculations with both Pythium and Rhizoctonia in the same fruits did not speed up the action. Fruits not in contact with the soil or with infected fruits did not rot. Ripe fruits did not become infected with the Pythium. Trellising would appear to be the first control measure to be effective.

Cabbage seedlings observed damping off in the seed beds yielded a Fusarium and Rhizoctonia solani. Sclerotium rolfsii was also secured from other diseased cabbage seedlings.

Table 4. Important disease producing fungi observed on the major farm crops at Allahabad, India, during the crop seasons, June 1945 to March 1946.

Crop	Common name	Causal Organism	Estimated damage	Remarks
Cereals			%	
1. Jowar (*Andropogon sorghum*)	Red spot	*Colletotrichum graminicolum*	10	Red spot was retarded by low rainfall and high humidity during July and August.
	Leaf spot	*Cercospora sorghi*	Tr.	
	Leaf spot	*Curvularia* sp.	Tr.	On seeds causing low germination and seedling loss.
	Rust	*Puccinia purpurea*	Tr.	
2. Bajra (*Pennisetum typhoideum*)	Downy mildew	*Sclerospora graminicola*	10	
	Kernel smut	*Sphacelotheca cruenta*	10	
	Rust	*Puccinia penniseti*	Tr.	
3. Sugar cane (*Saccharum officinarum*)	Red rot	*Colletotrichum falcatum*	1-2	
4. Maize (*Zea mays*)	Bacterial stalk rot	?	15	Two organisms isolated from diseased stalks but identity not determined.
	Root rot	*Fusarium* sp.	5	

Table 4 (cont.)

5. Wheat (Triticium aestivum)	Root rot	*Pythium* sp.	25	See notes, p. 289-290.
		Rhizoctonia solani		
	Leaf rust	*Puccinia triticina*	1-5	First appearance Feb. 9, 1946.
	Stripe rust	*Puccinia glumarum*	Tr.-1	First appearance about Feb. 9, 1946.
	Stem rust	*Puccinia graminis* var. *tritici*	10-20	First appearance about first week of February 1946.
	Smut (loose)	*Ustilago tritici*	Tr.	
	Leaf mold	*Choanephora* sp.	Tr.	Slight damage to leaves of seedlings.
6. Oats	Loose smut	*Ustilago avenae*	5	Only susceptible varieties suffered loss.
7. Barley (*Hordeum vulgare*)	Covered smut	*Ustilago hordei*	5-7	
	Stem rust	*Puccinia graminis*	Tr. to 20	Infections varied with conditions. Dry land infections were low. Irrigated grain high.
	Stripe rust	*Puccinia glumarum*	Tr. to 5	
	Stripe	*Helminthosporium* sp.	Tr.	
8. Rice (*Oryza sativa*)	Leaf spot	*Helminthosporium* sp.	Tr.	
Legumes.				
1. Arhar (*Cajanus indicus*	Root rot	*Fusarium* sp.	1-2	

Table 4. (cont.)

2. Sann hemp (*Crotalaria juncea*)	Leaf spot	*Cercospora* sp.	Tr.	Unofficial reports stated that the leaf spot was severe at Benares, 75 miles north.
	Blossom mold	*Choanephora* sp.	Tr.-5	
3. Peanuts (*Arachis hypogea*)	Leaf spot	*Cercospora personata*	Tr.	Weather apparently had much to do with the appearance of the leaf spot.
	Root rot	*Sclerotium rolfsii*	Tr-15	Varietal difference marked. Death in one variety 15%.
4. Guar (*Cyamopsis psoraleoides*)	Leaf spot	*Phyllosticta* sp.	Tr-5	
5. Gram (*Cicer arietinum*)	Rust	*Uromyces ciceris-arietini*	Tr.	
Garden and Truck Crops				
1. Tomatoes (*Lycopersicon esculentum*)	Mosaic	Leaf roll	Up to 50	Late plantings suffered more than the early plantings.
	Green fruit rot	*Pythium* sp.	30	Infection confined to the fruits touching the soil.
		Rhizoctonia solani	?	The *R. solani* was associated with the *Pythium* but acted more slowly.
	Leaf spot	*Alternaria solani*	Tr.	
	Yellows	*Fusarium* sp.	10	

Table 4 (cont.)

(Lycopersicon esculentum)	Yellows	*Rhizoctonia* sp.	?		Associated with *Fusarium* and amount of damage not determined.
	Galls	*Heterodera marioni*	5-10		
2. Potatoes (*Solanum tuberosum*)	Leaf roll	Virus	Tr.		
	Spindle tuber	Virus	Up to 10		Damage difficult to estimate as the potatoes were slender as to type and soil poor.
	Early blight	*Alternaria solani*	Tr.		Early blight appeared very late in the season.
	Cercospora leaf spot	*Cercospora concors*	Tr.		
3. Curcurbits.	Mosaic	Not identified	10-30		At least 90 percent of the plant infected with 10 percent dead May 15, 1946.
	Powdery mildew	*Erysiphe cichoracearum*	5		90 percent of leaves infected.
	Blossom blight	*Choanephora cucurbitarum*	Tr.		Only flowers attacked.
4. Peas (*Pisum sativum*)	Powdery mildew	*Erysiphe polygoni*	10		
5. Beans (*Phaseolus vulgaris*)	Leaf spot	*Cercospora* sp.	Tr.		
	Anthracnose	*Colletotrichum lindemuthianum*	Tr.		A culture was also secured from beet leaves nearby while isolating *Cercospora beticola*.*
6. Cabbage (*Brassica oleracea*)	Leaf spot	*Alternaria* sp.	Tr.		
	Root rot	*Rhizoctonia solani*, *Sclerotium rolfsii*	5-10		Damping off in the seed beds was found to be partly due to these two fungi.

Table 4 (cont.)

7. Beets (*Beta vulgaris*)	Leaf spot	*Cercospora beticola*	5	
8. Chillies (*Capsicum annum*)	Leaf roll	Virus	Up to 50	Seasonal infection pattern same as for tomatoes.
9. Brinjal (*Solanum melongena*)	Leaf spot	*Cercospora* sp.	5-10	
Fruits				
1. Citrus	Canker	*Pseudomonas citri* (*Bacterium citri*)	Up to 20	Infection differs with different varieties.
	Scab	*Elsinoë fawcetti*	Tr. to 1	
	Die back	*Colletotrichum*	Up to 5	A *Colletotrichum* resembling *C. gloeosporioiies* was isolated but not identified. Also an isolation resembling *C. limetticolum* was made but not identified.
	Root rot	*Fusarium* sp.	No estimation	Root rot is very slow and estimation of loss is difficult.
2. Jack fruit	Dying branches	*Colletotrichum* sp.	5-10	Lower branches died with slow spreading to larger limbs.
3. Papaya (*Carica papaya*)	Fruit spot	*Colletotrichum lagenarium*	Tr. to 15	The fungus was put through Koch's postulates by L. C. Nott, of the Biol. Dept. of the Institute, thus proving pathogenicity.
	Root rot	*Pythium* sp.	10 to 15	Not *P. aphanidermatum*.

Table 4 (cont.)

Papaya cont.	Root rot	*Fusarium* sp.	10 to 15	Estimated loss is for all of the root rot fungi together.
		Rhizoctonia solani		
	Leaf spot	*Phyllosticta* sp.	Tr.	Probably *Phyllosticta papayae* Sacc.
	Stem rot	*Pythium aphanidermatum*	Tr.	
4. Guava (*Psidium guajava*)	Die back	*Cephalospora* sp.	20	Isolated, but cultural characters not carried out.

* This is not a suggestion that bean anthracnose will also occur on garden beets.

During the late fall and winter months (October to January) young papaya trees suffered severely from a combination of fungi causing root rots. These have been most serious in the young plantings but some loss has also been observed in the nursery. The first symptoms are usually a yellowing of the lower leaves, later the terminal leaves will yellow and wilt followed by the death of the plant. Examination of the root systems disclosed a soft rot of many of the smaller roots and sometimes even the tap root was found decayed. In some cases isolations of the invading fungi were made from roots to a depth of as much as 16 inches below the surface of the soil. Pythium and Fusarium spp. and Rhizoctonia solani have all been isolated from the diseased roots. In addition to the fungi, trees in the older orchards are badly infested with nematodes (probably Heterodera marioni (Cornu) Goodey).

As the young papaya orchard seemed due for a very severe loss, it was decided to follow the suggested formula as offered by Du Ponts with regard to formaldehyde. As soon as a young tree appeared to be affected, it was immediately removed and the area about the root system was wet with a 2% solution of formaldehyde at the rate of 1/2 gallon to each square foot. Allowing about 10 days to elapse for the dissipation of the formaldehyde, the area was replanted to young trees. This work has been under the direct supervision of Mr. Theordore Dean, of the Horticultural Department of the Institute, who has made an accurate map of the entire planting and has recorded each tree removed and the date of the replant. By this means it is hoped to secure some valuable data on the efficacy of a soil disinfectant for the root rotting fungi of the papaya. Up to the present time, none of the replanted trees have died. Close observation will be kept over these trees during the coming season as a means of determining the value of such a treatment.

Old papaya trees have very few healthy roots remaining. All are either decayed, badly scarred from attacks of fungi, or knotted with nematode galls. The question arises regarding the length of the bearing life of the papaya tree. It is rarely more than three years under local conditions. If the root system can be protected from attacks of fungi and nematodes, can the length of life be prolonged? Such a possibility makes the problem an interesting one, to say the least.

The period from November to February was marked by very low rainfall (see Figure 1); as a result the appearance of the leaf, stripe and stem rusts of wheat and barley was retarded. The three rusts usually appear in the order named, but this season they were all found within about a week after the first spots were observed. The first rust appeared in a local village farm February 9 and during the same week it was found in two places on the Institute farm. The appearance of rust, especially the leaf rust, may be expected any time after the first of December; but a rather unusual feature of the 1945-46 season

was that, even though the rust was very late in appearing, it came with a rush and, but for this very lateness, would have done serious damage.

Potatoes harvested in March and April suffered an average of some 8 percent loss from tuber rots. Isolations from the rotting tubers produced a Fusarium sp. and a Sclerotium-like fungus. The latter is extremely active and when pure cultures were inoculated into surface sterilized tubers a rot was produced that resembled the bacterial soft rot of Erwinia carotovora, also present, but gave off a mousy odor rather than the disagreeable odor of the soft rot. The decay was slower than the soft rot of bacteria. These preliminary studies have not been sufficient to determine the amount of rot in the field to be attributed to each of the pathogens.

A very heavy teaching schedule, a small staff and a limited laboratory have prevented the study and identification of most of the isolations made during the crop seasons just past.

For the past two months seed germination studies, to determine viability and seed borne fungi, have been carried out in the Agricultural Institute Biology Laboratory by Dr. W. N. Rice, recently of Iowa State College Seed Laboratory, Ames, Iowa, who is en route to Burma. Several fungi have been isolated and some interesting observations have been made. Jowar (Andropogon sorghum) has proven especially interesting. For example, when jowar seed was surface sterilized with 0.2% mercuric chloride for one to two minutes, washed in sterile distilled water and plated on plain agar, germination of five lots, taken from different parts of the Institute Farm, was 88, 82, 83, 78, and 86 percent. When these seedlings were permitted to grow on the agar for one week, the survival was 55, 41, 53, 64, and 56 percent. This seedling loss appeared to be due to several fungi of which a Fusarium and a Curvularia apparently predominated. When the Curvularia was used in pure culture infection of treated seedlings was easily secured and the fungus reisolated. A Rhizoctonia was also found among the fungi infecting the seeds.

From this brief report it is evident that research should go forward along several lines simultaneously. The collection and utilization of weather data, the study of soil-borne fungi and their control, and the establishment of a seed laboratory to study the seed-borne fungi should be given high priority.

ALLAHABAD AGRICULTURAL INSTITUTE
ALLAHABAD, U. P. INDIA

CHECK LIST REVISION

Freeman Weiss

ANANAS (BROMELIACEAE)

ANANAS COMOSUS (L.) Merr., PINEAPPLE. Native of tropical America, widely cult. in tropical and subtropical regions for edible fruit; some forms also grown for ornament. In the U.S. and possessions grown commercially in Hawaii and P.R., sparingly in southern Fla.

Aphanomyces sp., root rot. Hawaii.

Asterinella stuhlmanni (P.Henn.) Theiss., leaf spot. P.R., Virgin Is.

Ceratostomella paradoxa Dade (Thielaviopsis paradoxa (DeSeyn.) Hoehn.), leaf base rot, white leaf spot, soft rot of fruit. General in tropical America, also in Fla. and Hawaii.

Fusarium sp. (? F. moniliforme Sheldon), brown rot of fruit, bud rot, secondary root rot. Hawaii, P.R.

Heterodera marioni (Cornu) Goodey, rootknot. Fla., Hawaii. An important factor in decline of commercial pineapple culture in Fla.

Hymenula affinis (Fautr. & C.R.Lambert) Wr., secondary root rot. Hawaii.

Penicillium spp., blue mold (on fruit). Cosmopolitan. Reported also as sometimes causing internal brown rot.

Phytomonas ananas Barker, fruitlet black rot. P.R. Antedates P. ananas Serrano and probably differs from it and Erwinia ananas Serrano.

Phytophthora spp., heart rot (of stems and buds), root rot. In Hawaii. P. parasitica Dast., P. cinnamomi Rands, and P. palmivora Butl., cause heart rot and root rot; the first 2 spp. also cause green fruit rot. P. parasitica also causes leaf-base rot in the West Indies. P. citrophthora (R.E.Sm. & E.H. Sm.) Leonian and P. drechsleri Tucker are also reported on this host in Hawaii.

Pratylenchus pratensis (De Man) Filip., root nematode. Hawaii.

(Pseudopythium phytophthoron Sideris): Phytophthora cinnamomi.

Pythium spp., root rot, wilt (in part). Hawaii. P. arrhenomanes Drechs. is predominantly implicated; other spp. identified are: P. aphanidermatum (Edson) Fitz., P. acanthophoron Sideris, P. artotrogus (Mont.) DBy., P. debaryanum Hesse, P. graminicolum Subr., P. indigoferae Butl., P. irregulare Buis., P. mamillatum Meurs, P. megalocanthum DBy., P. polymorphon Sideris, P. rostratum Butl., P. splendens Braun, and P. vexans DBy.

Rhizidiocystis ananasi Sideris, in root hairs. Hawaii.

Rhizoctonia sp. (? R. solani Kuehn), root rot. Hawaii.

Ananas cont.

Rhizopus stolonifer (Ehr. ex Fr.) Lind, fruit rot. Hawaii.
Rotylenchus multicinctus (Cobb) Filip., root nematode. Hawaii.
R. similis (Cobb) Filip. also has been reported but perhaps doubtfully.
(Thielaviopsis paradoxa (De Seyn.) Hoehn.): Ceratostomella p.
Tylenchus brachyurus Godfrey, root nematode. Hawaii.
Trichoderma viride Pers. ex Fr., secondary fruit mold. Hawaii.

Yellow spot -- virus (Lethum australiense Holmes, Ananas virus 1 (Lycopersicum virus 3) K.M.Sm.). Hawaii. Similar symptoms are induced by artificial inoculation of pineapple with cucumber mosaic virus but natural infection has not yet been reported.
Chlorosis -- mineral deficiency, chiefly of iron, associated with calcareous soils or sometimes (Hawaii) with excess of manganese. Hawaii, P.R.
Green spot -- local spotting of foliage attributed to feeding injury of mealy bugs (Pseudococcus brevipes Cockerell). Hawaii, especially when certain symbionts of the insect are present.
Mealy bug wilt -- toxic effect of feeding of mealy bugs, Pseudococcus brevipes. Fla., Hawaii, P.R.
Spike (long leaf) -- cause unknown but believed physiological, perhaps due to acid-reacting fertilizers. Fla., P.R.
White spot -- chlorotic spotting of foliage induced by insect punctures with secondary Thielaviopsis infection.
Wilt -- a complex disease associated with various biological agents as fungi (Pythium, Phytophthora, Rhizoctonia), and nematodes (Heterodera and Tylenchus, q.v.), in Hawaii caused chiefly by mealy bugs.
Yellows -- form of chlorosis caused by manganese toxicity. Hawaii.

BROMELIA (BROMELIACEAE)

BROMELIA PINGUIN L., PINGUIN (1); also BROMELIA spp. (2). Tropical American herbs grown for ornament.

Echinodes bromeliae Ryan, on leaves. P.R. (2)
Gloeosporium sp., leaf spot. Fla., Md. (2)
Marasmius sacchari Wakker, collar rot. P.R. (1)
Toroa dimerosporioides (Speg.) Syd., on leaves. P.R. (1)

TILLANDSIA (BROMELIACEAE)

TILLANDSIA USNEOIDES L., SPANISH MOSS (1), Pendulous epiphyte on forest trees in the Southern States and throughout tropical America; sometimes collected as packing and stuffing material. T. RECURVATA L., BALL MOSS (2), similar but more compact, ranges from Fla. to Tex.

Colletotrichum bromeliacearum Birge, on stems. Tex. (2).
Volutella cylindrospora (Berk. & Curt.) Sacc., on stems. La. (1)

ATRIPLEX (CHENOPODIACEAE)

ATRIPLEX spp., SALTBUSH. Annual herbs or woody perennials, deciduous or evergreen, mostly on arid plains and especially in saline soils in the Western and Southwestern States. A BREWERI Wats. (1) is grown in Calif. as a hedge plant; A. CANESCENS (Pursh) Nutt. (2), A. CONFERTIFOLIA (Torr.) Wats. (3), and A. POLYCARPA (Torr.) Wats. (4) are important food plants for wildlife and furnish forage for livestock. Some spp. are useful in erosion control; a few are eaten for greens. A. PATULA L. var. HASTATA (L.) A. Gray (5) and A. ROSEA L. (6) are common weeds.

Anguillulina aberrans Thorne, root gall. Utah (3).
(Ascochyta atriplicis Died.): Stagonospora atriplicis.
Cercospora dubia (Riess) Wint., leaf spot. Iowa, Mont., N.Y., N.Dak., Wis. (5 and spp.)
Heterodera marioni (Cornu) Goodey, root knot. Calif. (spp.)
H. schachtii A. Schm., root nematode. Utah (3, 6, sp.)
Neotylenchus latus Thorne, in roots. Utah (3)
Peronospora farinosa (Fr.) Keissl., downy mildew. Mont. (5) Reported as P. effusa (Grev.) Rab., but see note on this sp. under Chenopodium album; also identified as P. littoralis Gäum.
Pratylenchus aberrans (Thorne) Filip., root nematode. Utah (3)
Puccinia aristidae Tracy (0,I), rust. Colo., Del., Me., N.Y., N.Dak., Utah (5); on A. rosea, Ariz., Colo., Nev., N.Mex., Utah; on A. wolfii Wats., Colo. II and III on Distichlis spicata and other grasses.
Stagonospora atriplicis (West.) Lind, leaf spot. N.J., N.Y., Pa. (5); Kans. (sp.). Also reported as Phyllosticta atriplicis West. and Septoria a. (West.) Fckl.
Uromyces shearianus Arth. (0,I,III), rust. Ariz. (4); Calif. (2 and spp.); N.Mex. (2); Colo., Utah, Wyo. (3).
Urophlyctis pulposa (Wallr.) Schroet., leaf and stem gall. N.Dak. (5)

Atriplex spp. cont.

Curly top -- virus (Chlorogenus eutetticola Holmes, Ruga verrucosans Carsner & Bennett, Beta virus 1 K.M.Sm.). On various spp., especially (5) and (6), also A. argentea Nutt., A. expansa Wats., and A. serenana A. Nels., on which the vector, Eutettix tenellus, overwinters.

BETA (CHENOPODIACEAE)

BETA VULGARIS L., GARDEN BEET (1), SUGAR BEET (2). These two agronomic groups are not customarily distinguished in a botanical sense, and records of associated organisms often fail to discriminate between them. Other derivatives of B. vulgaris are treated as botanical varieties (see below). The culture of garden beets is general throughout the U.S., the leading commercial centers being Tex., La., N.J., N.Y., and Wis. The principal areas of sugar beet cultivation in the West are Colo., Calif., Nebr., Mont., Ida., Utah, Wyo. and, for seed, Ariz. and N.Mex.; in the Central States, Mich., Minn., and Ohio.

Actinomyces scabies (Thaxt.) Güssow, scab. Widespread on (1), especially in the North from Me. to Va. and westward to Calif. and Wash.; also N.Car., Tex. and Alaska; occasional on (2), Conn., Ida., Ind., Iowa, Ohio. The name Streptomyces has been proposed for the group of organisms to which this sp. belongs but specific combinations have not yet been made.

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crown gall. Occasional -- Conn., Ind., N.J., Pa., Wash., Wis. (1); Calif., Colo., Ida., Kans., Mich., Mont., Ohio, Tex., Utah (2)

? Albugo bliti (Biv.-Bern.) Kuntze, white rust. Iowa (2), Ohio (1).

Alternaria sp., leaf spot (secondary). Probably general but specifically reported from Calif., La., Mass., N.H., N.J., N.Y., Wash. (1); Calif., Colo., Ida., Mich., Utah (2). Also reported as secondary storage rot in Colo. (2).

A. tenuis Nees ex Wallr., seed discoloration. Calif. (1,2)

Aphanomyces cochlioides Drechs., black root, damping off, taproot tip rot. Probably general; reported from Calif., Colo., Iowa, Mich., Minn., Mont., Ohio, S.Dak., Wash., Wis. (2)

Bacterium teutlium Metcalf, soft rot. Nebr. (2)

Cercospora beticola Sacc., Cercospora leafspot, blight. General (1,2)

Clasterosporium putrefaciens (Fckl.) Sacc., secondary leaf browning. Mich., Wash. Reputed to be the conidial stage of Pleospora putrefaciens (Fckl.) Frank.

Cuscuta spp., dodder. Occasional on (2) when host follows alfalfa or other legumes in rotation; C. campestris Yuncker is most

Beta Vulgaris cont.

common, C. californica Choisy and C. subinclusa Dur. & Hilg. have been colonized on this host.

Cylindrocarpon radicicola Wr., secondary storage rot. N.Y. (2)

Diplodia sp. See Physalospora

Ditylenchus dipsaci (Kuehn) Filip., stem and leaf nematode. Kans. (1)

Erysiphe polygoni DC., powdery mildew. Calif. (2)

Fusarium spp., seedling blight, root rot, black root (secondary), storage rot. General (1,2). The uncertainty of identification and the confusion of names makes precise records impossible or misleading, but if due allowance is made for synonymy and the existence of specialized parasitic races, the principal spp. of Fusarium causing diseases of beets can be placed in the following 3 groups:

1. Occurring on roots: F. culmorum (W.G.Sm.) Sacc., F. equiseti (Cda.) Sacc., F. scirpi C.R.Lambert & Fautr. -- synonyms of F. roseum Lk. emend. Snyder & Hansen; F. dimerum Penz. and F. merismoides Cda. (F. betae (Desm.) Sacc.) -- synonyms of F. episphaeria (Tode ex Fr.) Snyder & Hansen; F. orthoceras App. & Wr. and F. vasinfectum Atk. var. lutulatum (Sherb.) Wr. -- synonyms of F. oxysporum Schlecht. emend. Snyder & Hansen; F. solani (Mart.) Appel & Wr.
2. Storage rots: F. avenaceum (Fr.) Sacc., F. culmorum (W.G.Sm.) Sacc., F. diversisporum Sherb., F. equiseti (Cda.) Sacc., F. flocciferum Cda., F. reticulatum Mont., F. sambucinum Fckl., F. scirpi C.R.Lambert & Fautr., F. semitectum Berk. & Rav., F. trichothecioides Wr. -- synonyms of F. roseum Lk. emend. Snyder & Hansen; F. dimerum Penz. and F. merismoides Cda.; F. argillaceum (Fr.) Sacc. and F. javanicum Koord. var. radicicola Wr. -- synonyms of F. solani (Mart.) Appel. & Wr. emend. Snyder & Hansen.
3. Wilt or Fusarium yellows. F. conglutinans Wr. var. betae D. Stewart (F. orthoceras Appel & Wr. var. betae (D. Stewart) Padwick) -- a specialized race of F. oxysporum Schlecht. emend. Snyder & Hansen. Colo., Mont., Nebr., N.Mex., S.Dak., Wyo. (2)

Gloeosporium betae Dearn. & Barth., leaf spot. Miss. (1), Mont. (2)

Helicobasidium purpureum (Tul.) Pat. (Rhizoctonia crocorum DC. ex Fr.), violet root rot. Ohio, W.Va. (1); occasional in Western States, Colo., Mont., Tex., Utah, Wyo. (2)

Heterodera marioni (Cornu) Goodey, root knot. Widespread, Va. to Fla., Tex., and Calif. (1); occasional in the Western States from Nebr. and Ida. to Tex. and Calif., also Ohio (2)

H. schachtii A. Schm., root gall. Calif., Colo., Ida., Iowa,

Beta vulgaris cont.

Minn., Mont., Nebr., S.Dak., Utah, Wyo. (2)

Heterosporium betae Dowson, on leaves. Wash. (1)

Macrophomina phaseoli (Maub.) Ashby, charcoal rot. Calif. (2)

Mycosphaerella tabifica (Prill. & Del.) Lind. See Phoma betae, of which this is reputed to be the ascigerous stage though not based on cultural proof; some reports under this name but apparently no U.S. collections.

Pellicularia filamentosa (Pat.) Rogers (Rhizoctonia solani Kuehn), damping off, crown rot, dry rot canker, leaf blight. General in one phase or another (1 and 2), especially on (2) in the Western States typically only in the Rhizoctonia stage; the leaf blight form reported on (2) chiefly in humid regions (Ill., Mich., Minn., Wis.; also Colo. and Nebr.) readily produces the basidial stage.

Penicillium spp., storage rot and mold (mostly secondary), sometimes on seedlings. Cosmopolitan. P. commune Thom, P. digitatum (Fr.) Sacc. and P. roseum Lk. ex Thom have been specifically noted as pathogenic on beets.

Peronospora schachtii Fckl., downy mildew. Calif., Oreg., Wash. (1,2); N.Y. (1)

Phoma betae Frank, seedling root rot, black rot of growing and heart rot of mature roots; also leaf spot. Occasional on (1) as cause of leaf spot and associated with heart rot (boron deficiency); general on (2) especially as cause of seedling root rot and black rot of mature beets. The name Phoma betae was independently proposed by Frank and is not a transfer of Phyllosticta betae Oud., an earlier name. Mycosphaerella tabifica is assumed to be the ascigerous stage on the basis of association.

Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., N.Mex., Tex. (1,2)

Physalospora rhodina (Berk. & Curt.) Cke. (Diplodia tubericola (Ell. & Ev.) Taub.), root rot. Ala. (1),?Colo. (2)

Phytophthora drechsleri Tucker, taproot rot, wet rot. Calif., Colo., Ida., Oreg., Utah (2).

Pseudomonas aptata (N.A.Brown & Jamieson) Stapp, black streak. Calif., Oreg., Utah, Wash. (2).

P. beticola (E.F.Sm., N.A.Brown & Town.) Stapp, bacterial pocket. Occasional in Central and Western States from Mich. and Iowa to Tex., Calif., Wyo.; also Md. and Va. (2)

Puccinia aristidae Tracy (O,I), rust. Colo., Kans., N.Mex., Utah (2). Usually only on cotyledons and very young plants. II and III on many grasses.

Pythium spp., damping off, root rot. Cosmopolitan (1,2). P. aphanidermatum (Edson) Fitz., causing a fatal root rot of seedlings, is reported on (2) in Calif., Utah, and Wis.; P. butleri Subr. and P. ultimum Trow are similarly recorded in Calif., Colo., S.Dak., Wyo., and doubtless occur elsewhere;

Beta vulgaris cont.

P. debaryanum Hesse, commonly reported on (1) and (2) is the principal cause of damping off of beets in Iowa; P. dissotocum Drechs. was associated with root necrosis of (2) in Mich. P. butleri also causes a taproot rot of mature beets in Colo.

Ramularia beticola Fautr. & C.R.Lambert (R. betae Rostr.), leaf spot. Calif., Oreg., Wash. (2)

Rhizoctonia sp. (spp.), damping off, root rot, crown rot, late canker, leaf blight. Cosmopolitan. For R. crocorum see Helicobasidium purpureum; for R. solani see Pellicularia filamentosa.

Rhizopus spp., wound rot, storage rot. Cosmopolitan. Usually cited as R. stolonifer (Ehr. ex Fr.) Lind (R. nigricans Ehr.) but R. arrhizus Alf. Fisch. also has been shown pathogenic to beets.

Sclerotinia sclerotiorum (Lib.) DBy., root rot, crown rot. Conn., Ill. (1)

Sclerotium rolfsii Sacc., southern blight, sclerotial rot. N.Car. to Fla., Tex. and Calif., chiefly on (1), sometimes on (2) as Ariz., Calif., Ga., Iowa, La., Tex.

Septoria betae West., leaf spot. Del., Ind., Mass. (1); Ind., Ohio (2)

Stemphylium botryosum Wallr., discoloration of seed. Calif. (1,2)

Tylenchus penetrans Cobb, root nematode. Utah (2)

Uromyces betae (Pers.) Lév. (II,III), rust. Ariz., Calif., N.Mex., Oreg., Wash. (1,2). Cycle includes 0 and I but only II and III reported on Beta in the U.S.

Verticillium albo-atrum Reinke & Berth., wilt. Colo. (2)

Volutella oxyspora Atk., on roots. Ala. (1)

Curly top -- virus (Chlorogenus eutetticola Holmes, Ruga verrucosans Carsner & Bennett, Beta virus 1 K.M.Sm.) General in the West from western S.Dak. and Nebr. to Tex., Calif., and Wash., also southern Ill.; commonly on (2), sometimes on (1)

Mosaic -- virus (in part Marmor betae Holmes, Beta virus 2 K.M. Sm.). Western States from Nebr. to Tex., Calif., and Wash., also Md. and Va. (2), occasionally on (1). In part Marmor cucumeris Holmes, reported on (2) in Calif., Mich., and Ohio. Mosaic due to an undetermined virus is reported in Ind. and Minn., and a different form of mosaic called calico or veinbanding is known in Colo., Nebr., and N.Mex. Systemic infection of beets by the viruses of dodder latent mosaic, tobacco mosaic and turnip ringspot has been demonstrated.

Savoy -- virus (Savoia piesmae Holmes). Colo., Iowa, Mich., Minn., Nebr., Ohio, S.Dak., Wyo. (2). Presumably related to the crinkle (leaf curl) virus of beets in Europe but the American virus has a different vector (Piesma cinerea Say).

Beta vulgaris cont.

Yellow vein (? calico) -- unidentified virus. Calif., Colo. (2)

Black heart. (See phosphorus deficiency).

Black root -- chiefly fungus infection, especially Aphanomyces cochlioides, Pythium spp., Rhizoctonia solani, and Phoma betae; in part due to nutritional deficiency as of organic matter, phosphorus and nitrogen. General, reported especially in Calif., Mich., Mont., N.Y., Ohio, Wash., Wis. (2,1)

Chlorosis -- mineral deficiency (iron, manganese) induced by excess of lime. N.Y., R.I. (1).

Girdle (strangle) -- constriction of tap root near soil surface; attributed to mechanical injury by wind. N.Y. (1). Perhaps also indicative of boron deficiency as reported in Ill. and Md. (1)

Heart rot (dry rot) -- boron deficiency. General, especially in humid regions as Mass., Mich., Minn., N.Y., Ohio, Wis.; also Calif., Oreg., Wash. (1,2)

Phosphorus deficiency (black heart, in part). General, reported especially in Calif., Colo., Mont., Nebr., N.Mex., Utah, Wyo.; also Mich., N.Y., Ohio, Wis. (2)

Potassium deficiency (bronzing). Occasional, reported especially in Iowa, Ohio, Wash. (2)

Tip burn (black tip) -- physiological, attributed to effect of periods of low light intensity on plants grown with high nitrogen content of soil. Western States -- Colo. to Ariz., Calif. and Wash. (2)

BETA VULGARIS var. CICLA (L.) Moq., LEAF BEET, SWISS CHARD (1), and var. MACRORHIZA, MANGEL (2). Widely grown (1) for greens in home gardens, (2) for fodder and silage in the Northern States.

Actinomyces scabies (Thaxt.) Güssow, scab. Conn., Wash. (2)

Agrobacterium tumefaciens (E.F.Sm. & Town.) Conn, crowngall. Conn., Pa. (2)

Alternaria tenuis Nees ex Wallr., seed discoloration. Calif. (1)

Cercospora beticola Sacc., leaf spot. General (1,2)

Erwinia carotovora (L.R.Jones) Holland, soft rot. Wash. (2)

Fusarium sp., root rot. Wash. (2)

Heterodera marioni (Cornu) Goodey, root knot. La. (1)

Heterosporium betae Dowson, leaf spot. Wash. (2)

Peronospora schachtii Fckl., downy mildew. Calif. (1)

Phoma betae Frank, root rot, leaf spot. Minn., N.Y., Va., Wash., Wis. (2)

Phymatotrichum omnivorum (Shear) Dug., root rot. Tex. (1,2)

Physalospora abdita (Berk. & Curt.) N.E.Stevens and P.rhodina (Berk. & Curt.) Cke., on leaves. Fla. (1)

Pythium aphanidermatum (Edson) Fitz., damping off, root rot. Calif. (1,2). P. debaryanum Hesse, in Colo., Conn., Kans.,

Beta vulgaris cont.
Mich., N.J., Utah, Wis. (2)
Ramularia beticola Fautr. & C.R.Lambert, leaf spot. Wash. (1)
Rhizoctonia solani Kuehn, damping off, root rot. N.Y. (1), Wash. (2)
Sclerotinia sp. (? S. sclerotiorum (Lib.) DBy.), crown rot. Miss. (1), Wash. (2)
Sclerotium rolfsii Sacc., southern blight. La. (1,2), S.Car. (1), Tex. (2).
Stemphylium botryosum Wallr., seed discoloration. Calif., Wash. (1,2)
Uromyces betae (Pers.) Lév. (II), rust. Calif. (1), Oreg. (1,2), Wash. (2)

Curly top -- virus (Chlorogenus eutetticola Holmes, Beta virus 1 K.M.Sm.) Ariz., Calif. (1); Oreg. (1,2); N.Mex., Wash. (2)
Mosaic -- virus (Marmor betae Holmes, Beta virus 2 K.M.Sm.). Ariz., Calif. (1)
Heart rot (dry rot, cracked stem) -- boron deficiency. N.Y. (1), Wash. (2)

DIVISION OF MYCOLOGY AND DISEASE SURVEY

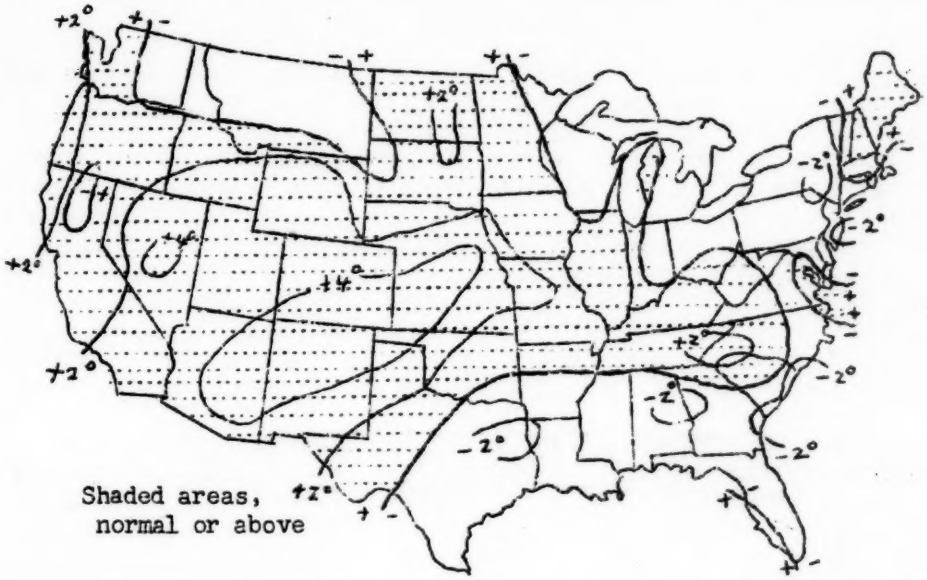
JUNE WEATHER

(From U. S. Department of Commerce, Weather Bureau, Weekly Weather and Crop Bulletin for week ending, July 2, 1946.)

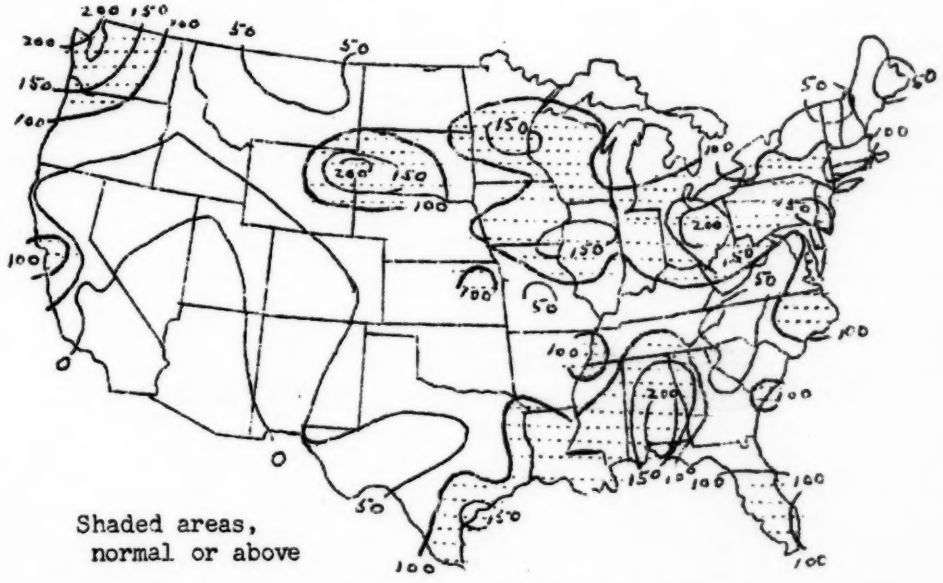
Map I shows that the month of June 1946 was warmer than usual over practically the entire area from the Pacific coast eastward over the central and southern Rocky Mountain region and north-central interior to the western Carolinas, with the plus anomalies exceeding 4° in many far Southwestern areas and extending as far northeast as southeastern Nebraska. Elsewhere temperatures averaged near normal to a few degrees below, especially in the South. The minus anomalies exceeded 2° in northeastern Texas, north-central Alabama, and sections of Georgia.

Map II shows that rainfall for June 1946 was below normal in most areas from the south-central Mississippi Valley westward over the central and southern Great Plains, the greater portion of the Rocky Mountain region, and the far Southwest. Most stations in the Great Basin, Arizona, and southern California reported no measurable precipitation. Less than the usual amounts were also received in northwestern Border States and in central Virginia and the western Carolinas.

Totals were heavy along the Gulf coast, in western Washington, western South Dakota, northeastern Wyoming, and quite generally from the upper Mississippi Valley eastward over the southern Lake region and upper Ohio Valley to the Jersey coast. Accumulations for the month were more than twice their normals in sections of Alabama, Ohio, southeastern Pennsylvania, northeastern Wyoming, western South Dakota, and on the Washington coast.



Map I. Departure of Mean Temperature from the Normal, June, 1946.



Map II. Percentage of Normal Precipitation for June, 1946.